DOCKET NO. MEGENS 1-10-5 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Mischa Megens
Serial No.:	10/040,017
Filed:	01/04/2002
For:	FABRICATING ARTIFICIAL CRYSTALLINE STRUCTURES
Group No.:	1756
Examiner:	Martin J. Angebranndt

I hereby certify that this correspondence is being electronically filed with the United States Patent and Trademark Office on May 18, 2007

Marty Balko
(Printed or typed name of person signing the certificate)

/Marty Balko/
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Sir:

APPELLANTS' REPLY BRIEF UNDER 37 C.F.R. §41.41

In response to the Examiner's Answer mailed March 26, 2007, the Appellants submit the following reply.

I. Reply to Examiner's Answer

The Appeal Brief argued that Popovich's use of a photoinitiator dye to allow sensitivity to visible wavelengths would not motivate one of ordinary skill to modify Campbell or Turberfield's use of an ultraviolet laser wavelength, because Campbell and Turberfield teach that their Epon-type photoresist has low intrinsic absorption at the ultraviolet wavelength (Page 11, section C.b.1). Such low absorption is important because attenuation of light by absorption in the photoresist limits the thickness of structures that can be made dimensionally homogeneous (Campbell, page 55, column 1 lines 24-27).

The Examiner's Answer appears to acknowledge that to achieve similar thicknesses cured by exposure, the dose and duration of visible light exposure by Popovich and Neckers is greater than that used by Campbell and Turberfield's ultraviolet light exposure (Examiner's Answer, Page 11, Lines 12-15). But then the Examiner holds that Necker's 60 second exposure, "is not very long and certainly not sufficient to offset the benefit of being able to actually see the beams when performing the alignment and exposure" (Examiner's Answer, Page 11, Lines 15-17).

The Appellants respectfully maintain that Popovich and Necker's use of much higher doses or durations of visible light exposure do present issues that would have deterred one of ordinary skill in the art from modifying Campbell or Turberfield to include Popovich's photoinitiator dye. For instance, the doses of visible light that the Examiner says Neckers uses (Examiner's Answer, Page 11, Line 14) is 15 to 300 times greater than the does of ultraviolet light used by Campbell or Turberfield. In addition, the duration of Necker's exposure with visible light is 60 seconds, which is 10 billion times longer than the 6 nanosecond duration of the ultraviolet light exposure used by Campbell or Turberfield. As pointed out in the Appeal Brief (page 12, section C.b.2), Campbell and Turberfield disclose important benefits associated with using their short exposure time. A short

exposure time avoids the perturbation of the interference pattern due to photoinduced changes in the refractive index of the precursor and eases the constraints on the required amount of mechanical stability for the optical components (Campbell, Page 54, Column 1, Lines 26-31).

The Examiner concludes that the above-discussed difference in the dose and duration of light, the use of ultraviolet light, and Campbell and Turberfield's disclosed benefits, are outweighed by being able to see the light beams when performing bean alignment and when exposing the monomer. The Examiner argues that although the composition resulting from modifying Campbell or Turberfield to include Popovich's photoinitiator dye is less sensitive, the practical difference in exposure time does not offset the benefit of spectral sensitivity (Examiner's Answer, Page 13, Lines 21-22). The Examiner states that, the "movement of monomer or the like would not be an issue in the combination" (Examiner's Answer, Page 13, Lines 10-11).

The Appellants respectfully submit that the Examiner has ignored the benefits of the short exposure time with ultraviolet light, as taught by Campbell or Turberfield, in favor of the Examiner's own speculative advantages.

There is no basis for the Examiner's conclusion that visible light exposure on the order of 1 minute, as entailed by the use of Popovich's photoinitiator dye, "is not very long" as compared to Campbell or Turberfield's ultraviolet light exposure times of 6 nanoseconds. For instance, the Examiner's Final rejection or Appeal Brief Answer has presented no evidence that significant perturbations of the interference pattern, which are avoided by Campbell's or Turberfield's short exposure times, would not occur over the Examiner's proposed much longer 1 minute timescale. Indeed, from Campbell or Tuberfield, one could reasonably expect that photo-induced changes in refractive index and/or mechanical vibrations of optical components occur on this time scale. Thus, the prior art teachings of Campbell or Turberfield appear to teach away from the use Popovich's

photoinitiator dye, because that would have entailed using exposure times that are 10 billion times longer than used by Campbell or Turberfield.

There is also no basis for the Examiner's conclusion that avoiding perturbations of the interference pattern, by using a 6 nanosecond exposure time as taught by Campbell or Turberfield, is outweighed by being able to see the visible light beams during alignment and exposure. As pointed out in the Appeal Brief (Page 12, section C.b.1) Campbell and Turberfield did not identify the alignment of their ultraviolet light beam as being problematic. Nor has the Examiner's Final rejection or Appeal Brief Answer provided any evidence to show that aligning such beams was difficult.

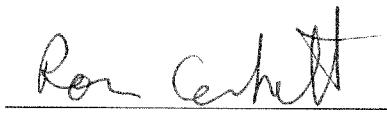
Turberfield and Campbell taught the importance of ultra-short exposure times to avoid undesired effects of pattern change and mechanical vibrations. In light of such explicit teachings of how to avoid problems with long exposures, one of skill in the art would not have modified the processes of Tuberfield and Campbell in the manner suggested by the Examiner. Such a modification would have involved increasing the exposure time by a factor of over one billion, in direct opposition to the prior art teachings of the important advantages of ultra short exposure times.

For these reasons and the reasons presented in the Appeal Brief, the Appellants maintain that the combination of either Campbell or Turberfield with Popovich, Neckers and Oxman as applied by the Examiner is improper.

II. Conclusion

For the reasons set forth above and in the Appeal Brief filed December 4, 2006, the claims on appeal are patentably non-obvious over the prior art of record. Accordingly, the Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's Final Rejection of all of the Appellant's pending claims.

Respectfully submitted,
Hitt Gaines, P.C.



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